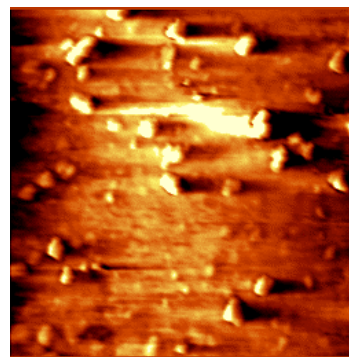
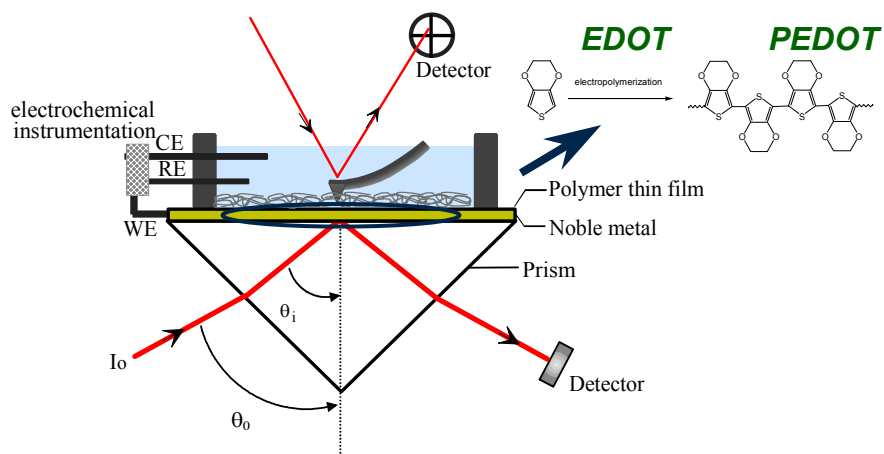


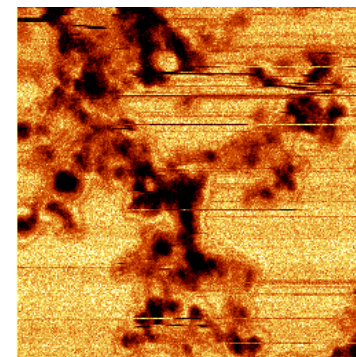
# Development and Acquisition of Surface Sensitive Electrochemical Instrumentation using Evanescent Wave and Nonlinear-Optical Techniques for Research and Education: NSF-DMR-0315565

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Department of Chemistry, University of Houston



Polyaniline covered gold particles on ATP/HOPG

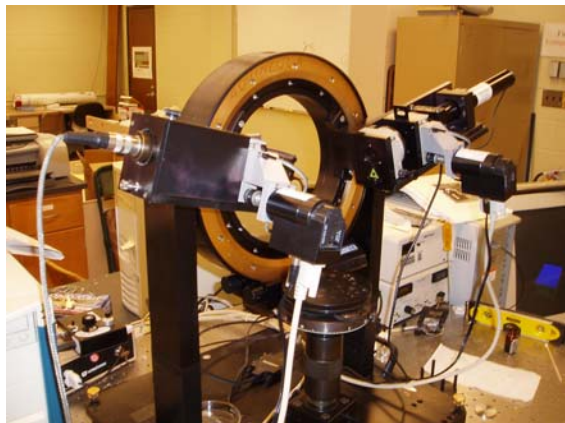


SNOM of Polyaniline fiber

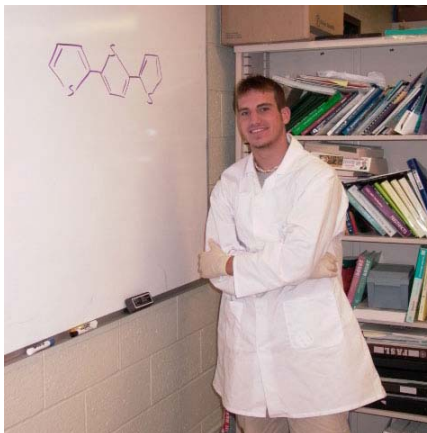
Recently, we have succeeded in configuring a combined surface plasmon spectrometer-electrochemistry, and AFM set-up. Some of our initial results on PEDOT(polythiophene) polymerization showed interesting kinetics where the observed morphology can be correlated to the electrochemical potential and change in the optical reflectivity by SPR.

We have also investigated the fabrication and characterization of composite nanoparticles using near-field optical techniques. Nanoparticles are created using chemical and electrochemical techniques. Typically these particles are composed of metal cores with polymer shells. The resulting size and optical properties are probed using near-field imaging with a 488 nm  $\text{Ar}^+$  laser. Other nanostructure investigated include polymer nanofibers, and semiconductor particles.

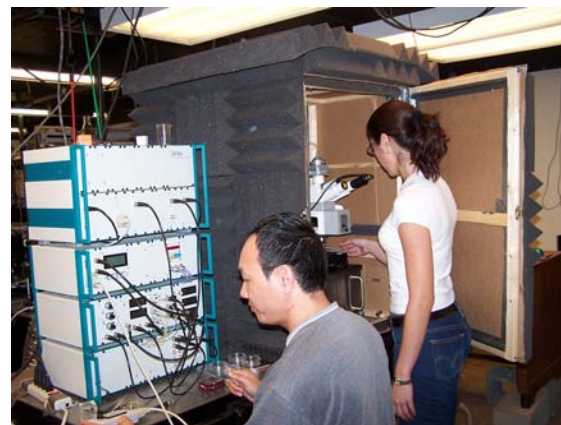
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Surface plasmon spectrometer being prepared for a combined AFM and electrochemical cell experiment.



High school student Rocky Byers learning about conjugated polymers.



Dr. Ting Lei and Ph.D. student Selimar Rivera working with the Near-field microscope

The use of the instruments involved training in instrument design, development, and use in a number of materials applications. Our collaboration included joint group meetings with the Advincula and Baldelli groups and joint experiments with members of the two groups.

**Ph.D. Students involved in the project:** Jason Locklin, Tim Fulghum, Selimer Rivera

**Post-docs:** Dr. Akira Baba and Dr. Ting Lei

**Undergraduate Students:** Risheng Xu, Matthew Mullings

**High school students:** Rocky Byers, Christian Oncescu